Shallow Lake Renovation Based on Alternative Stable Trophic States

by Joe Larscheid and Michael Hawkins
Spirit Lake Hatchery, 122 252nd Avenue
Spirit Lake, IA 51360
(712) 336-1840
Joe.Larscheid@dnr.state.ia.us; Michael.Hawkins@dnr.state,ia,us

Shallow lakes are one of the most challenging lake types to manage for water quality. Shallow lakes are known as "tweener" lakes in Minnesota and Wisconsin since they are too shallow to be consistently good lakes, and too deep to be consistently good marshes. They are right smack in the middle of the two extremes. Most shallow lakes in Iowa can exist in either of two conditions; the turbid water state or the clear water state. When these lakes exist in the turbid water state they are characterized by very turbid water, little to no aquatic vegetation, limited emergent vegetation, a sparse fishery dominated by carp and bullheads, and limited waterfowl production and hunting opportunities. However, many of these same lakes can also exist in a clear water state which is typified by clear water, abundant aquatic vegetation, shallow bays covered with emergent vegetation, a desirable fishery dominated by bluegills, northern pike, yellow perch, and largemouth bass, and enhanced waterfowl production and hunting opportunities.

These shallow lakes can exist for years as either a clear, or a turbid water state. Both of these states are relatively stable and it takes a major perturbation to move from one state to another. For instance, a drought can shrink the shoreline of a turbid lake exposing mud flats that are quickly colonized by cattails. After the drought the lakes refill with water flooding this emergent vegetation. These cattails help hold and solidify the bottom effectively preventing the bottom mud from getting stirred up by the wind, boating activity, or even fish. The water clarity greatly increases on the lake because of the decreased muddy water from these shallow water areas. This clear water state will usually last as long as the cattails persist. However, cattail beds decrease in size each year they are flooded with water. In a few years these beds mostly disappear and all of a sudden, wham, we are back into the turbid water state. This cycle is natural, but our current drainage and management patterns have favored consistently higher water levels, and consequently most of our lakes have little to no emergent vegetation and, therefore, most of these lakes are currently in the turbid water condition. The goal of this project is to develop tools that managers can use to shift and maintain shallow lakes in a clear water state.